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R. C. DeYoung, Assistant Director for Pressurized Water Reactors, L

METEOROLOGY SECTION FOR REPORT TO THE ACRS ON THREE MILE ISLAND STATION - UNIT 1 - DOCKET NO. 50-289

Enclosed is the meteorology section for inclusion in the report to the ACRS on Three Mile Island. This evaluation was performed by Earl H. Markee, Jr., Site Analysis Branch, L.

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Enclosure:
As stated

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POOR ORIGINAL

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THREE MILE ISLAND NUCLEAR STATION, UNIT 1
DOCKET NO. 50-289
ACRS REPORT INPUT
METEOROLOGY

POOR ORIGINAL

The plant is situated on an island in the Susquehanna River with rolling hills on both sides of the river. The prevailing airflow over the site is northwesterly due to the influence of large scale weather patterns and the relatively shallow river valley orientation.

The accident and annual average diffusion conditions have been evaluated from measurements of wind direction, wind direction fluctuations (sigma theta) and wind speed at the 100-foot level of an onsite tower. The onsite meteorological data collection program was initiated in May 1967 and the applicant has presented two years (May 1967 - May 1969) of these data in summary form as joint frequency distributions for our evaluation. The data recovery during the two year period was [illegible].

The applicant's analysis of sigma theta data [illegible] Pasquill stability classes from data at the 100-foot level can be inferred from data at other sites to compare favorably with the staff's method using vertical tempera- [illegible] modified so that reasonably conservative estimates of stability classes could be made during calm and light wind speed situations when the wind direction vane is not responding accurately to the fluctuations of wind direction.

For evaluation of diffusion of short-term accidental releases from the plant, a ground level release with a building wake factor, cA, of 1000 m^2 was assumed. The relative concentration which is exceeded 5% of the time was calculated from the modified joint frequency distribution to be 9.8 x 10^{-4} sec/m^3 at the exclusion distance of 610 m with the wind speed reduced to represent air movement at a level of 10 meters above the ground. This relative concentration is equivalent to the dispersion conditions produced by Pasquill type F stability with a wind speed of 0.6 meters/second. The calculation appears to provide an adequate, conservative estimate because the sigma theta method of stability classification from measurements that are 100 feet above the ground is conservative. The applicant has used values which are less conservative by a factor of five due to his use of a light wind diffusion model during stable atmospheric conditions which [illegible] conducted at the site. The results of these diffusion tests have been evaluated by the staff with the conclusion that the staff now guides that diffusion conditions are [illegible] than indicated by the sigma theta [illegible] new models [illegible] the results.

For longer time period accidental releases the relative concentrations presented in the [illegible] appear to provide adequately conservative [illegible]

The limiting annual average relative concentration of 2.9×10^{-5} sec/m^3 was found at the nearest island 633 m southwest of the plant. This value is a factor of six higher than the applicant's value due to his use of the unmodified joint frequency distribution and not reducing the wind speed for elevation.

It is our opinion that the meteorological data presented in the PSAR provide an acceptable basis for the development of conservative atmospheric dilution factors for use in the staff's dose models. However, the presentation of at least a year of data with vertical temperature gradient measurements which is in their ongoing program may produce slightly different results.